Plan Title:	**Management Plan for the Open Systems Technical Architecture**
Plan Number:	**CB-IT-97-02-N**
Plan ID:	**IT**

1. Introduction

Strategic Mission

The Bureau of the Census (BOC) has a mission statement toward which IT efforts and resources are being applied:

> *To be the preeminent collector and provider of timely, relevant, and quality data about the people of the United States. We will succeed by:*
> - *Valuing our employees,*
> - *Innovating in our work, and*
> - *Responding to our customers*

To achieve this vision, the BOC has defined four basic goals within its Strategic Plan:

- Greater Customer Satisfaction
- Greater Productivity
- Better Public Perception and Cooperation
- Develop a More Diverse, Effective, and Skilled Work Force

Key to the successful attainment of these goals is the innovative application of information technology. The BOC requires a single, interoperable environment throughout the Bureau within three years.

Charting Our Course

An interoperable environment is one in which different systems can communicate and work together. To provide this essential environment, we must be proactive in charting a course that can be followed despite changes in organizations, policies, or technology. We must plan for change and incorporate flexibility to continue on course and accomplish our goals.

In order to provide the single, interoperable environment throughout the Bureau, we must transition the current "islands of information" into a seamless enterprise information asset available to employees and customers alike. Fundamental to this transition is the Open System Technical Architecture (OSTA).

OSTA is the framework in which the interoperable environment is being built. This framework includes:

- Standards - The definition of software, telecommunications, and hardware standards based on the industry standard open systems model. This includes both architectural and operational standards.
- Higher Level Programming Languages - The definition of Fourth Generation Languages (4GLs) such as SAS and Oracle and Object Oriented languages.
- Distributed Processing - The support for client/server applications.

OSTA is designed to be the central core around which services and applications critical to providing the single, interoperable environment will be created. OSTA provides the framework principles, guidelines, and standards to support an environment that is portable, interoperable, and scalable and allows:

- Applications to be developed rapidly and consistently to run over a variety of hardware platforms which will provide tools to employees when and where they are needed.
- Applications to be easily ported to newer, faster, more competitive hardware and communications environments to increase productivity and return on development investment.
- Bureau-wide procurements to decrease cost and processing time.
- Directorates to share corporate assets, including employees.

We are realizing OSTA by defining the standards, issuing those standards to all directorates within BOC, defining a plan for transitioning to OSTA, ensuring executive level support for transition, acquiring products and services that are OSTA compliant, managing the transition process at the executive level using the Executive Information System and the project level using the division level project reports, and measuring the benefits by establishing baselines and analyzing the progress.

Resources for acquisitions which will create the architecture itself will remain in the individual Program Development Plans (PDPs) and will be consistent with the OSTA framework principles, guidelines, and standards.

This document defines OSTA, provides the status of development, and specifies the remaining steps to complete the OSTA framework.

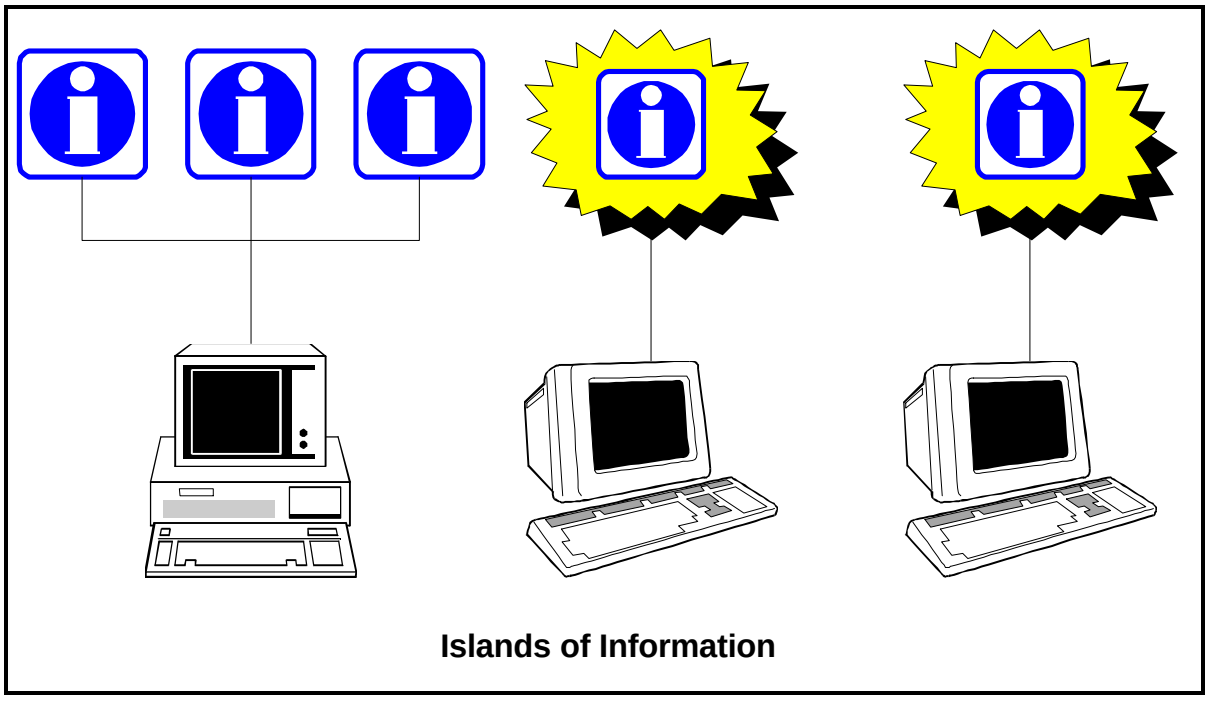
2. Approach

We will achieve OSTA by transitioning from the current disjointed and proprietary architecture into the open systems architecture over the next several years. The transition will take several years to accomplish to avoid disruptions and to ensure current levels of customer service while building the flexible OSTA infrastructure. Once this infrastructure is established, we will be able to achieve our strategic goals.

Current Architecture

The current environment reflects an architecture that was once state-of-the-art but is unable to keep pace with our rapidly changing requirements. It is an environment characterized by older systems that reside on the Unisys and DEC platforms. There are some newer systems that exist on our networks (e.g. PC based systems, client/server systems, etc.) that are more flexible and responsive to change. Both systems, old and new, need to be transitioned to OSTA.

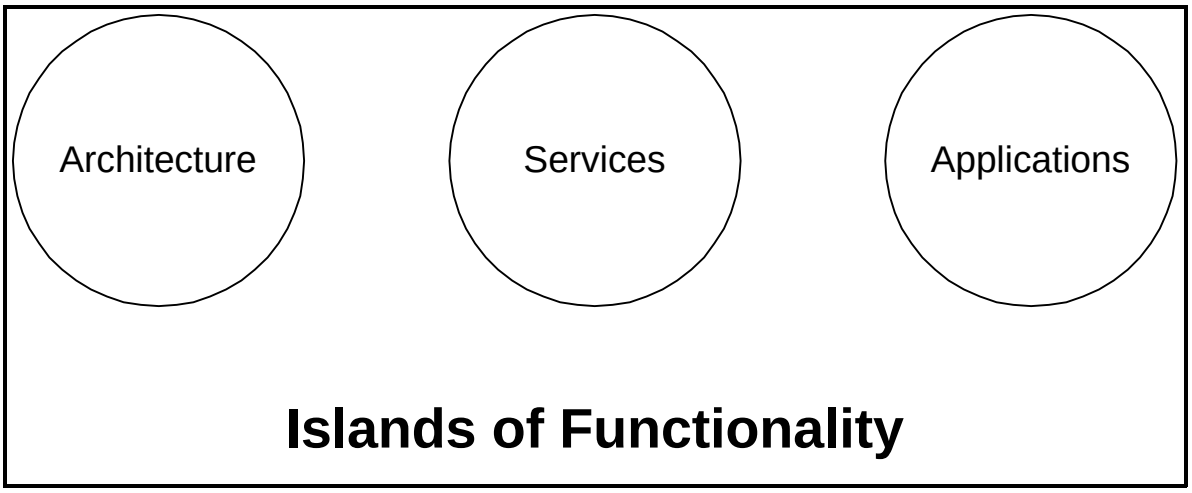
To our customers and employees, this mix of old and new systems has resulted in "islands of information" that require specialized workstations and effort to access the desired information. In some cases, an employee must have two or three workstations on his/her desk to access necessary information!



Islands of Information

The current development environment is also difficult to deal with because of "islands of functionality" within BOC. The underlying architecture of the old and new systems are not

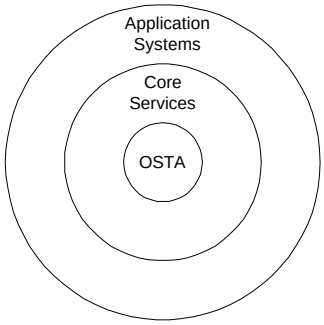
integrated to, or interfaced with, the services and applications. This results in duplicate efforts to provide the same services on different architectures or in different applications.



Future Architecture

The future environment will be based on OSTA to provide an architecture that is state-of-the-art and able to keep pace with our rapidly changing requirements. OSTA will provide functionality and services to customers, employees, and applications alike so that a single, interoperable environment is achieved and information is available globally ("global information" vice "islands of information").

OSTA will be the core around which other services and applications will be based. OSTA will provide a stable core environment by defining software, hardware, and telecommunications standards which are based on industry standards. Software standards include Unix for operating systems, SAS for computational programs and Oracle for relational databases. Hardware standards include 64-bit multi-processors servers, Plug-and-Play, and fault tolerance. Telecommunications standards include TCP/IP for addressing and SNMP for network management.



Future Architecture

Once OSTA is established, core services will be developed to provide consistent, seamless services to users and applications BOC wide. These core services include:

- Computation - Supports Census "peak" processing requirements.
- Authentication - Verifies authorized access to Census services, data, and resources.
- Firewall and Router - Protects secure data and resources.
- Data Distribution - Provides non-Title 13 data and information to external organizations.
- Communication - Provide outbound and authorized remote access.
- Archival - Provide access to archived data and databases.
- Electronic Data Interface - Provide electronic commerce and electronic data interchange
- Optical Mark and Character Recognition - Convert image data into character data
- Optical - Provides access to optical storage devices.
- Imaging - Provides storage and retrieval of electronic images.
- User - Provides complete, consistent set of personal productivity tools.
- Backup - Provide short term file backup in case of disk failure.
- Media - Provides access to different media types for data access and manual data movement.

The future development environment will be able to utilize OSTA and the core services to provide applications more rapidly to our customers and employees so that they have the "right tool at the right time." Applications will be based on distributed processing across the network and will utilize a three tier approach:

- Tier 1 - Client. The user workstation.
- Tier 2 - Compute Server. The server(s) accessed to perform the application processing.
- Tier 3 - Data Server. The server(s) accessed to provide the data required.

This three tiered approach will allow data, services, and applications to become corporate assets which can be utilized and shared throughout the BOC.

Transition

Due to the complexity and diversity of the BOC current architecture, IT will need three years to transition to OSTA and provide a single, interoperable environment throughout the BOC. In order to achieve this strategic goal, we must have clear direction and priorities, key steps and milestones, executive support to maintain the priorities, and a management process to monitor our progress toward our goal.

In order to transition to OSTA, we must first complete the first iteration of OSTA. The three elements of the OSTA framework, standards, higher level programming languages, and distributed processing, are being defined in parallel efforts that will allow portions of OSTA to change and evolve as requirements and technology evolve. The current status is:

- Standards - The definition of the standards that comprise OSTA has been started and is due to be completed in FY 1997. Based on recommendations made by Electonic Data Systems (EDS) in their Standards Selection: A Recommended Procedure for Implementation Within the U.S. Bureau of the Census, 14 standards were recommended and, to date, nine have been defined. The recommended standards were categorized as architectural or operational and prioritized by critical impact on BOC functions. They are being defined and implemented in priority order.

- Higher Level Programming Languages - The definition of the higher level languages began after the standard for operating systems (POSIX Server) was drafted in January 1994 and completed with the acquisition of a site license for SAS in September 1995. To date, SAS and Oracle have been procured and transition of some applications has begun. All applicable applications should be transitioned to SAS and Oracle by Q1 FY 1998.

- Distributed Processing - The support for client/server applications started after the definition of the TCP/IP and Netware were drafted in FY 1995 and will be complete in FY 1999. This element is tied to the transition from legacy equipment (Unisys, DEC).

The second transition step is the definition and implementation of the core services. The core services have been defined and implementation has begun on three (Data Distribution, Archive, Media). All services are planned to be implemented by Q1 FY 1999.

We anticipate a five-year application transition period due to the incremental procurement and implementation cycle required for the OSTA standards and core services. This is because the standards and services an application will utilize must be available before that application can be transitioned.

The accomplishment of these steps and the realization of OSTA is not possible without executive level support. To ensure that support, each Associate Directorate must approve the IT Operational Plan and their PDP submitted each year as required by the BOC Chief Financial Officer (CFO). In addition, IT issues and critical decisions are routinely discussed at the weekly Executive Committee Staff meetings.

The IT directorate is responsible for managing the OSTA project and reports to the Executive Committee. We have implemented several management processes to assist us in our tracking and reporting efforts, as detailed in Section III, and we monitor the projects using the Executive Information System and project level reporting.

OSTA should be up and running by Q1 FY 1999 to meet our strategic goal. Management of the transition process is summarized in the following section.

3. Management Processes

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The criticality of OSTA in meeting BOC goals requires that the transition process be controlled and managed. We have set up several management processes for this effort due to the size and complexity of the BOC and the pervasiveness of the transition. Each process is linked to one or more OSTA framework elements to focus attention on critical path items that can adversely impact the OSTA transition. The overriding goal of each of these processes is to not impact the transition while providing enough feedback and updates to adequately control the implementation of the transition.

Open Systems Transition Staff

We have created an Open Systems Transition (OST) Staff to keep focused on the long-term issues of transition to OSTA. This staff consists of dedicated employees who serve as a central coordination point for all transition planning. Their charter is to:

- Evaluate current systems,
- Assess future computing technologies and identify platforms to be used, and
- Acquire, test, accept, and transfer the selected open systems to operational divisions for BOC use.

By having one central group focused on the transition technology and issues, they are a resource that can be tapped by the BOC Directorates rather than each Directorate attempting to obtain and maintain the necessary technical expertise. The OST Staff are also in a position to identify trends and leverage solutions across the BOC to minimize risk and cost. Services we provide to the BOC as part of the OST Staff charter include:

- Determining whether technology is compatible with existing systems,
- Determining whether technology is compatible with existing systems,
- Assessing the impact of technology on mission goals and budgets,
- Acquiring technology and services, and
- Managing technical aspects of contracts for technology and services.

IT Policies

We have implemented a variety of policies to assist the BOC in implementing OSTA. These policies are detailed in the IT Directorate Policy Manual and communicate the relevant portions of the architecture into actions employees can follow to assist in the transition effort and be compliant with the OSTA. These policies are distributed by hard copy to all executive management and by electronic copy to all senior managers. To ensure the latest information is available to all BOC employees, we have established an electronic bulletin board called the IT Policies and Standards Bulletin Board.

Policies relating to security, including passwords, data transfers, encryption, and confidentiality, are developed and promulgated by the ADP Security Branch as part of the Census Security Office functions. These policies also include security requirements for connection to the Internet.

IT Standards

One of the key concepts OSTA is based on is the definition of standards for hardware, software, and telecommunications. By defining these standards and issuing them to the directorates, they can base their future plans on OSTA compliant systems. The standards include detailed information to support acquisitions, configuration guidelines, and maintenance procedures. Each standard is reviewed every six months to ensure any technological or requirement changes are considered. To date, nine out of 14 standards have been defined:

	STANDARD	TYPE	STATUS
1	POSIX Server (hardware and software elements and guidelines)	Architecture	Draft
2	Calendaring	Operational	
3	Terminal Emulation	Operational	Issued
4	Desktop Backup	Architecture	Issued
5	Data Archiving (standard data archive file format)	Architecture	Issued
6	Database Functional Requirements (multi-user relational database criteria)	Architecture	Issued
7	PC Hardware Configuration (hardware specifics)	Architecture	Issued
8	Workstation Configuration (hardware and software elements and guidelines)	Architecture	Issued
9	Workstation System Administration (security, backup, etc.)	Operational	Issued
10	Database Applications Documentation (requirements and guidelines for documentation)	Operational	Draft
11	Novell File Server	Operational	Research
12	cc:Mail Use (electronic mail)	Operational	Issued
13	Configuration Management	Architecture	Research

	STANDARD	TYPE	STATUS
14	Modem Use (dial-in, dial-out access)	Operational	Issued

The latest standards are promulgated on the IT Policies and Standards Bulletin Board. All acquisition efforts are coordinated with procurement to ensure purchases are in compliance with the promulgated standards.

IT Requirements Database

When defining standards and policies or planning OSTA, it is important to have a clear understanding of what information technology BOC needs to perform its business. In order to obtain the latest information, the Open Systems Transition Staff has developed and issued a Consolidated Information Technology Needs Survey in December 1995. Responses are still being gathered and will be placed into the IT Requirements Database. This database will then be available to all directorates to develop their IT plans, cost/benefit assessments, requirements initiatives, and acquisition planning.

All requirements will be reviewed every six months and a formal report summarizing all requirements will be issued once a year.

By placing this critical information in a centralized, electronic form, we now have a good picture of the requirements, can identify areas that can be combined or leveraged, and can use the information for requirements initiatives.

IT Partnerships

It is essential that all projects are included in the OSTA transition but some projects, due to their size, complexity, or visibility, are on the critical path. To ensure the smooth transition of these projects, we have established IT partnerships with them. The partnerships allow the OST Staff to directly work with key personnel on each of these projects during the planning, acquisition, and implementation phases. We have IT partnerships with the following projects:

- Population Division Departmental Computing - The partnership is working to jointly size, identify, and acquire a cost efficient OSE computing platform for transition of Population Division mainframe software systems. A first year major cost savings has been realized and the new application software will be portable across a number of computer hardware vendors and platforms.

- Economic Directorate Standard Economic Processing Systems (StEPS) - The partnership is developing a common survey processing system using SAS that can support around 100 economic surveys. A common system will significantly lower software development costs and will be portable across a number of computer hardware vendors and platforms.

- Governments Division Migration to an OSE - The partnership is transitioning mainframe applications to client/server applications. The successfully re-engineered applications provide significant cost-savings over traditional mainframe processing.

- Demographic Surveys Division Unix Systems Management - The partnership is providing Computer Services Division (CSvD) system managers experience supporting the OSTA standard Unix operating system. The effort promotes cooperation and information sharing between CSvD (central site) system managers who have no Unix experience and DSD (decentralized site) system managers who have been running Unix systems for the past three years. The partnership will provide a detailed system management strategy for Unix systems.

- Foreign Trade Division Desktop Upgrade - The partnership is upgrading obsolete PCs with OSTA standard PCs. This partnership will insure an efficient and orderly migration with minimal impact on productivity.

- Economic Directorate Network Server Consolidation - The partnership is migrating the existing directorate network of 22 servers to an OSTA compliant 4 server network.

- Services Division Commodity Flow Survey - The partnership is piloting using contractor personnel to implement OSTA compliant application systems to capture how goods are transported throughout the nation. The current application is using the SAS standard application.

Uniform Product Selection

In order to best leverage our investment in technology and training, we need to select Commercial Off The Shelf (COTS) software and hardware that are compliant with our defined standards and meet our user needs. Once the product is selected, economies of scale savings can be realized by obtaining BOC site licenses or quantity discounts. These savings can then be used for other critical BOC initiatives.

To date, we have selected the following products for the standards defined:

- Electronic mail - cc:Mail
- Word Processing - WordPerfect
- Statistical Analysis - SAS

- Relational Database - Oracle
- Local Area Network - Novell Netware
- Network Protocols - TCP/IP
- Internet - Netscape
- Graphical User Interface (GUI) - MS Windows

Acquisition Process

Since the BOC investment in OSTA is significant and our ability to meet our goals depends on OSTA, we need to ensure that IT related acquisitions meet the OSTA requirements. We will do this by putting IT in the acquisition process for technical review and compliance. This will ensure that additional software is not purchased when we have a site license, unsupported software is not purchased, and all acquisitions are in compliance with the directorate plans. Once IT has verified that the acquisition meets the OSTA standards defined, we will forward the request to purchasing.

In addition, we have implemented an IT Directorate Support Memorandum series that deals with support issues including acquisitions. To ensure the latest information is available to all BOC employees, these memorandums are placed on the IT Policies and Standards Bulletin Board.

OSE Training and Technical Seminars

By standardizing on hardware and software products such as IBM compatible PCs and WordPerfect, we are providing a consistent, stable environment to our employees. By also providing training and seminars on those products means we are training our people to use the tools at their disposal. The true benefit is realized when an employee moves and is immediately effective in his/her new environment because the equipment and tools are familiar. We will also see an overall increase in productivity as the users have time to utilize the power of the tools provided by implementing some of the more complex functions, such as inserting objects in a document.

4. General Benefits of OSTA

The goal of OSTA to provide a single, interoperable environment throughout BOC by transitioning the current "islands of information" into a seamless enterprise information asset will provide benefits across the BOC. These benefits will be monitored and measured by the Open Systems Transition Staff by tracking milestones, processes, and related budgets. General benefits to be achieved by OSTA include:

- Enhanced organizational effectiveness in acquiring computing resources - By having a clearly defined OSTA, BOC organizations will avoid the duplicated efforts and costs associated with doing research into IT solutions and will be able to focus on defining the

solution that works best within the parameters of OSTA. The resulting simplified initiatives will be more consistent and compatible and allow improved oversight and approval.

- Enhanced organizational flexibility - OSTA will allow organizations within BOC the flexibility to assign OSTA environment trained personnel anywhere within BOC, move OSTA compliant equipment within BOC to shift computing power to meet changing workloads, and concentrate resources (personnel and equipment) on projects when and where they are needed. This will reduce the need for every division to have the infrastructure necessary to support every operation and contingency.

- Increased personnel productivity and effectiveness - OSTA will allow personnel to be trained and to develop expertise in areas that will be in demand across the BOC, reducing the dependency on outside contractors. Personnel will also be able to move to various BOC directorates without a major retraining effort or risk to their careers.

- Enhanced electronic interaction with other organizations - By publishing OSTA, other organizations, including DOC, key electronic trading partners, government agencies, and the Internet, will be able to assess the feasibility of connecting electronically with BOC. This will reduce the BOC effort required to research and implement the connections while increasing BOC's potential reimbursable market.

- Reduced operating costs - OSTA will allow resources, from personnel and equipment to program code and procedures, to be shared across BOC reducing the cost of duplicating that effort and infrastructure.

- Reduced technical risk - OSTA will allow systems interoperability and requirements to be planned or included at a later date with minimal additional effort. This reduces the integration issues that arise during implementation and directly affect the cost and schedule.

- Reduced training requirements - OSTA will provide a stable consistent environment that will allow personnel to receive initial full training once with update or refresher training on a regular basis (e.g. annually). This eliminated the need to provide full initial training every time personnel change offices because a different suite of hardware and software are being used.

- Tighter security, based on well designed architecture - OSTA will allow a single, consistent environment to make secure. This reduces the risk incurred every time a conversion or exception is made to accommodate non-standard interfaces.